

PSHENYCHNYY, Nikon Ivanovich

[Lentils as a protein-rich crop] Sochevytsia-tsinna
bilkova kul'tura. Kyiv, Derzhsil'ho~~spvydar~~ URSS
1963. 4 p. (MIRA 17:10)

POKHESLAVSKIY, M.N.; SMIRNOV, N.D.

Fulfill the seven year plan ahead of time. Ugol' 39 no.5:15-16
My '64. (MIRA 17:8)

1. Shakhita im. Il'icha Lesta Kadiyovugol' (for Pokheslavskiy).
2. Normativno-issledovatel'skaya stantsiya kombinata Luganskugol' (for Smirnov).

Pshesmitskiy

POLAND / Virology. General problems.

E-1

Abs Jour: Referat Zh.-Biol., No 6, 25 March, 1957, 21679

Author : Pshesmitskiy, Dobrovolskaya

Inst :

Title : Development of Biological Methods for the Study of Virus.

Orig Pub: Zesz. probl. nauki polsk., 1956, No 7, 27-40. Dyskus.
235-277

Abstract: Review. Bibl. 43 refs.

Card : 1/1

-7-

Pshesmitskiy

POLAND / Virology. General problems.

E-1

Abs Jour: Referat Zh.-Biol., No 6, 25 March, 1957, 21678

Author : Pshesmitskiy

Inst :

Title : Virus Intracellular Development.

Orig Pub: Zesz. probl. nauki polsk., 1956, No 7, 109-120. Dyskus,
235-277

Abstract: Review. Bibl. 47 refs.

Card : 1/1

-6-

PSHETAKOVSKIY, I. L., Cand Med Sci -- (diss) "Significance of the determination of the mercapto- group of proteins, protein fractions, and the colloidal lability of blood serum in rheumatism and insufficiency of the circulation of blood." Odessa, 1960. 18 pp; (Odessa State Medical Inst im N. I. Pirogov); 300 copies; price not given; (KL, 25-60, 140)

PSHETAKOVSKIY, I.L.

Electrophoretic investigation of blood serum proteins. Vrach. delo
no.4:28-32 Ap '61. (MIRA 14:6)

1. Kafedra propedevtiki vnutrennikh bolezney (zav. - prof. TS.P.
Levina) Odesskogo meditsinskogo instituta.
(PAPER ELECTROPHORESIS) (BLOOD PROTEINS)
(BLOOD--CIRCULATION, DISORDERS OF)

PSHETAKOVSKIY, I.I.

Electrophoretic investigation of serum proteins in patients with
rheumatic fever associated with circulatory insufficiency. Terap.
arkh. 31 no.10:67-72 0 '59. (MIRA 13:3)

1. Iz kafedry propedevtiki vnutrennikh bolezney (zaveduyushchiy -
prof. TS.A. Levina) Odesskogo meditsinskogo instituta imeni N.I.
Pirogova.

(BLOOD PROTEINS)
(RHEUMATIC HEART DISEASE)

PSHETAKOVSKIY, I.L., kand.med.nauk (Odessa)

Work of the Odessa Province Cardiorheumatological Center. Sov.
zdrav. 21 no.2:39-41 '62. (MIRA 15:3)

1. Iz oblastnogo kardio-revmatologicheskogo tsentra (zav.
I.L. Pshetakovskiy) Odes'skogo oblastnogo otdela zdravookhraneniya
(zav. M.N. Mel'nik).

(ODESSA PROVINCE--CARDIOLOGY)

(ODESSA PROVINCE--RHEUMATISM)

PSHETAKOVSKIY, I.I.

Use of fluctuations in the level of the sulfhydryl groups of blood proteins for the differential diagnosis between rheumatic and lingering septic endocarditis. Vrach.delo no.6:647-649 Je '60.

(MIRA 13:7)

1. Kafedra propedeviki vnutrennikh bolezney (zav. - prof. TS.A. Levina) Odesskogo meditsinskogo instituta.
(BLOOD PROTEINS) (ENDOCARDITIS)

PSHETAKOVSKIY, I.L. (Odessa)

Results of medicinal prevention of recurrences in rheumatic fever. Klin.med. 38 no.8:129-133 Ag '60. (MIRA 13:11)

1. Iz oblastnogo kardno-revmatologicheskogo kabineta (zav. I.L. Pshetakovskiy) Odesskogo oblastnogo otdela zdravookhraneniya (zav. M.N. Mel'nik).

(RHEUMATIC FEVER)

PSHETAKOVSKIY, I.L.

Rheumatic fever in Odessa Province and results of its control
from 1956-1959 F '61. Terap.arkh. 33 no.2:18-22 F '61. (MIRA 14:3)

1. Iz oblastnogo kardiologicheskogo tsentra Odesskogo
oblastnogo otdela zdravookhraneniya.

(ODESSA PROVINCE—RHEUMATIC FEVER)

MAMUNYA, A.U.; BAYDAKOV, N.P.; PSHEVORSKAYA, V.Ya.

Use of the automatic refractometer for the testing and regulation
of the concentration of molasses solutions. Report No.2. Trudy
UkrNIISP no.9:21-25 '64.

(MIRA 17:10)

MAMUNYA, A.U.; PSHEVORSKAYA, V.Ya.; BAYDAKOV, N.P.

Improving the aeration process in the working and inoculation
fermenters. Trudy Ukr.NIISP no.8:100-108 '63. (MIRA 17:3)

MAMUNYA, A.U.; PSHEVORSKAYA, V.Ya.

Automation of the basic processes of the diluting shops. Trudy
UkrNIISP no.5:89-102 '59. (MIRA 16:11)

The nature of the chemical bond and quantum mechanics. S. Ya. Isheretskii. *Prirada* 20, No. 12, 659 (1937); *Chem. Zvesti.* 1930, 1, 1501. A discussion of the possibility of applying the principles of quantum mechanics to the problem of the chemical bond. — M. G. Moise.

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p><i>ca</i></p> <p>Theory of adsorption of vapors. S. Ya. Fikshinskiy. <i>J. Phys. Chem. (U. S. S. R.)</i> 11, 205-12(1958).—The adsorption isotherm of vapors is said to consist of 2 parts corresponding to the equations $a = bp^m$ and $a = C + B$ $\log p$, resp.; b, m, C and B are consts. The temp. variation of these consts. is calcd. on the assumption of the invariability of the adsorption potential with the temp. B. C. P. A.</p>																			
<p>ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
<p>10000 10100 10200 10300 10400 10500 10600 10700 10800 10900</p>										<p>11000 11100 11200 11300 11400 11500 11600 11700 11800 11900</p>									

1ST AND 2ND ORDER										3RD AND 4TH ORDER									
PROCESSING AND PROPERTY MODE																			
<p>0.8</p> <p>The polarity of ions in a heterogeneous field, and the calculation of the dissociation energy of ionic molecules. S. Ya. Finkelshteyn, <i>J. Phys. Chem. (U. S. S. R.)</i> 11, 703-800(1987). The effect of the electronic shells of pos. univalent ions on the "effective" polarity of neg. ions depending on the distance between them was detd. The law of repelling forces in the alkali metal halide mol. is related to the repelling potential in crystals, but is not identical with it. The repelling force in the mol. does not increase nearly so rapidly with decrease in the distance between the ions as it does in crystals. A semiempirical calcn. is given of the energy of dissoc., and of the equil. distance for the halide mol. (the fluorides, the chlorides, the bromides and the iodides of Na⁺, K⁺, Rb⁺ and Cs⁺). Correct results are obtained if the polarity values in a homogeneous field are taken for the calcn. of the dipole moments of these mol. W. R. Heun</p> <p>2</p>																			
<p>COMMON ELEMENTS</p> <p>OPEN</p> <p>MATERIALS MODE</p> <p>ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION</p> <p>FROM SYNDICATE</p> <p>FROM SYNDICATE</p> <p>FROM SYNDICATE</p> <p>FROM SYNDICATE</p>																			

PSHEZHETSKY, S. Ya.

"The Catalytic Dimerization of Ethylene"

Dokl. Akad. Nauk SSSR, Vol. 14, No. 9-10, 1940

1ST AND 2ND CORDS										3RD AND 4TH CORDS									
PROCESSES AND PROPERTIES INDEX																			
<p>Kinetics of the catalytic dimerization of ethylene. S. Ya. Rubinshtein and A. T. Gladyshev. <i>J. Phys. Chem.</i> (U. S. S. R.) 18, 688-69 (1941); cf. <i>C. A.</i> 35, 3884¹.—Ethylene was polymerized on a Ni catalyst at temps. from 280 to 400°. The Raman spectrum analysis of the products obtained shows that they consist of 50% <i>n</i>-butylene, 35% <i>cis</i>- and 15% <i>trans</i>-butylene. The rate of dimerization is directly proportional to the pressure of the ethylene in the gas phase.</p> <p style="text-align: right;">F. H. Rathmann</p>																			
<p>ASB-5LA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
FROM DIVISION										FROM DIVISION									
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<div style="position: relative;"> CA <div style="position: absolute; top: 100px; right: 10px; font-size: 2em; font-family: cursive;">2</div> <p style="margin-top: 100px;">Theory of the diffusion retardation of heterogeneous catalytic reactions. S. Ya. Pechenetskiy (Karpov Inst., Moscow). J. Phys. Chem. (U.S.S.R.):79, 376-81(1945).</p> <p>—When a gas mixt. traverses a bed of catalyst, the concn. of the reaction product in the outgoing gas, thus also the measurable rate of reaction, depends on the rate of diffusion of the reaction product from the interior of the catalyst grain to its surface and on the rate of diffusion of this product from the grain surface into the gas current. A formal theory is given for both these rates. The difference between the apparent and the true reaction consts. is proportional to the velocity of gas flow and to the square of the grain diam.</p> <p style="text-align: right;">J. J. Bikerman</p> </div>																																			
ASTM A1A METALLURGICAL LITERATURE CLASSIFICATION																		BETTER COPY																	
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M I N V A C O U G F H K L P R S T U W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ AR AS AT AU AV AW AX AY AZ BA BB BC BD BE BF BG BH BI BJ BK BL BM BN BO BP BQ BR BS BT BU BV BW BX BY BZ CA CB CC CD CE CF CG CH CI CJ CK CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DE DF DG DH DI DJ DK DL DM DN DO DP DQ DR DS DT DU DV DW DX DY DZ EA EB EC ED EE EF EG EH EI EJ EK EL EM EN EO EP EQ ER ES ET EU EV EW EX EY EZ FA FB FC FD FE FF FG FH FI FJ FK FL FM FN FO FP FQ FR FS FT FU FV FW FX FY FZ GA GB GC GD GE GF GG GH GI GJ GK GL GM GN GO GP GQ GR GS GT GU GV GW GX GY GZ HA HB HC HD HE HF HG HH HI HJ HK HL HM HN HO HP HQ HR HS HT HU HV HW HX HY HZ IA IB IC ID IE IF IG IH II IJ IK IL IM IN IO IP IQ IR IS IT IU IV IW IX IY IZ JA JB JC JD JE JF JG JH JI JJ JK JL JM JN JO JP JQ JR JS JT JU JV JW JX JY JZ KA KB KC KD KE KF KG KH KI KJ KL KM KN KO KP KQ KR KS KT KU KV KW KX KY KZ LA LB LC LD LE LF LG LH LI LJ LK LL LM LN LO LP LQ LR LS LT LU LV LW LX LY LZ MA MB MC MD ME MF MG MH MI MJ MK ML MN MO MP MQ MR MS MT MU MV MW MX MY MZ NA NB NC ND NE NF NG NH NI NJ NK NL NO NP NQ NR NS NT NU NV NW NX NY NZ OA OB OC OD OE OF OG OH OI OJ OK OL OM ON OP OQ OR OS OT OU OV OW OX OY OZ PA PB PC PD PE PF PG PH PI PJ PK PL PM PN PO PP PQ PR PS PT PU PV PW PX PY PZ QA QB QC QD QE QF QG QH QI QJ QK QL QM QN QO QQ QR QS QT QU QV QW QX QY QZ RA RB RC RD RE RF RG RH RI RJ RK RL RM RN RO RP RQ RR RS RT RU RV RW RX RY RZ SA SB SC SD SE SF SG SH SI SJ SK SL SM SN SO SP SQ SR SS ST SU SV SW SX SY SZ TA TB TC TD TE TF TG TH TI TJ TK TL TM TN TO TP TQ TR TS TT TU TV TW TX TY TZ UA UB UC UD UE UF UG UH UI UJ UK UL UM UN UO UP UQ UR US UT UV UW UX UY UZ VA VB VC VD VE VF VG VH VI VJ VK VL VM VN VO VP VQ VR VS VT VU VW VX VY VZ WA WB WC WD WE WF WG WH WI WJ WK WL WM WN WO WP WQ WR WS WT WU WV WW WX WY WZ XA XB XC XD XE XF XG XH XI XJ XK XL XM XN XO XP XQ XR XS XT XU XV XW XX XY XZ YA YB YC YD YE YF YG YH YI YJ YK YL YM YN YO YP YQ YR YS YT YU YV YW YX YY YZ ZA ZB ZC ZD ZE ZF ZG ZH ZI ZJ ZK ZL ZM ZN ZO ZP ZQ ZR ZS ZT ZU ZV ZW ZX ZY ZZ																		M I N V A C O U G F H K L P R S T U W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ AR AS AT AU AV AW AX AY AZ BA BB BC BD BE BF BG BH BI BJ BK BL BM BN BO BP BQ BR BS BT BU BV BW BX BY BZ CA CB CC CD CE CF CG CH CI CJ CK CL CM CN CO CP CQ CR CS CT CU CV CW CX CY CZ DA DB DC DE DF DG DH DI DJ DK DL DM DN DO DP DQ DR DS DT DU DV DW DX DY DZ EA EB EC ED EE EF EG EH EI EJ EK EL EM EN EO EP EQ ER ES ET EU EV EW EX EY EZ FA FB FC FD FE FF FG FH FI FJ FK FL FM FN FO FP FQ FR FS FT FU FV FW FX FY FZ GA GB GC GD GE GF GG GH GI GJ GK GL GM GN GO GP GQ GR GS GT GU GV GW GX GY GZ HA HB HC HD HE HF HG HH HI HJ HK HL HM HN HO HP HQ HR HS HT HU HV HW HX HY HZ IA IB IC ID IE IF IG IH II IJ IK IL IM IN IO IP IQ IR IS IT IU IV IW IX IY IZ JA JB JC JD JE JF JG JH JI JJ JK JL JM JN JO JP JQ JR JS JT JU JV JW JX JY JZ KA KB KC KD KE KF KG KH KI KJ KL KM KN KO KP KQ KR KS KT KU KV KW KX KY KZ LA LB LC LD LE LF LG LH LI LJ LK LL LM LN LO LP LQ LR LS LT LU LV LW LX LY LZ MA MB MC MD ME MF MG MH MI MJ MK ML MN MO MP MQ MR MS MT MU MV MW MX MY MZ NA NB NC ND NE NF NG NH NI NJ NK NL NO NP NQ NR NS NT NU NV NW NX NY NZ OA OB OC OD OE OF OG OH OI OJ OK OL OM ON OP OQ OR OS OT OU OV OW OX OY OZ PA PB PC PD PE PF PG PH PI PJ PK PL PM PN PO PP PQ PR PS PT PU PV PW PX PY PZ QA QB QC QD QE QF QG QH QI QJ QK QL QM QN QO QQ QR QS QT QU QV QW QX QY QZ RA RB RC RD RE RF RG RH RI RJ RK RL RM RN RO RP RQ RR RS RT RU RV RW RX RY RZ SA SB SC SD SE SF SG SH SI SJ SK SL SM SN SO SP SQ SR SS ST SU SV SW SX SY SZ TA TB TC TD TE TF TG TH TI TJ TK TL TM TN TO TP TQ TR TS TT TU TV TW TX TY TZ UA UB UC UD UE UF UG UH UI UJ UK UL UM UN UO UP UQ UR US UT UV UW UX UY UZ VA VB VC VD VE VF VG VH VI VJ VK VL VM VN VO VP VQ VR VS VT VU VW VX VY VZ WA WB WC WD WE WF WG WH WI WJ WK WL WM WN WO WP WQ WR WS WT WU WV WW WX WY WZ XA XB XC XD XE XF XG XH XI XJ XK XL XM XN XO XP XQ XR XS XT XU XV XW XX XY XZ YA YB YC YD YE YF YG YH YI YJ YK YL YM YN YO YP YQ YR YS YT YU YV YW YX YY YZ ZA ZB ZC ZD ZE ZF ZG ZH ZI ZJ ZK ZL ZM ZN ZO ZP ZQ ZR ZS ZT ZU ZV ZW ZX ZY ZZ																	

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p><i>Ca</i></p> <p>Kinetics of heterogeneous reactions on porous catalysts. S. A. Paberbetskii and R. N. Rubinshtein (Karpov Inst. Phys. Chem., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 20, 1127-36(1946)(in Russian); <i>Acta Physicochim. U.R.S.S.</i> 21, 1075-88(1946)(in English).—The diffusion of the reactants to the surface of a porous catalyst is discussed. The conditions are defined under which (a) no hydrodynamic flow is created by the reaction, (b) the diffusion of only one reactant needs to be considered, and (c) the temp. gradient within the catalyst grain has a measurable effect. A math. relation between the measurable and the true reaction rate is given. J. J. Bikerman</p>																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																			

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p><i>CA</i></p> <p>Progress of heterogeneous catalytic reactions in a stream. I. General equations. A heat-insulated system. S. Ya. Pshchetskii and R. N. Rubinshtein (Karpov Inst. Phys. Chem., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 20, 1421-34(1946)(in Russian).—A general quant. theory is given for the steady state of heterogeneous reactions taking place when a gas streams through a bed of catalyst. The rate of the over-all reaction can be detd. by the rate of the actual reaction process, by the rate of diffusion toward the catalyst, or by that within the grains of the catalyst. The temp. of the heat-insulated catalyst is calcd. for different rates of flow, concns. of the components, and lengths of the bed. The retardation due to reaction products is considered. J. J. Bickerman</p>																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									

PSHEZHETSKIY, S.

PA 54¹34

USSR/Chemistry - Catalysis
Chemistry - Kinetics

Nov/Dec 1946

"The Kinetics of Contact Reactions Over Porous Catalysts," S. Pshezhetskiy, R. Rubinsteyn, Karpov Inst Phys Chem, Moscow, 14 pp

"Acta Physicochimica URSS" Vol XXI, No 6

Shows development of simple relation between concentration of various components of the reaction, and reduction of system of equations describing process to an equation for diffusion of only one of components. Relation is approximately true in presence of a temperature gradient within granule of catalyst. A general form of analytical expression for relation be-

USSR/Chemistry - Catalysis (Contd)

Nov/Dec 1946

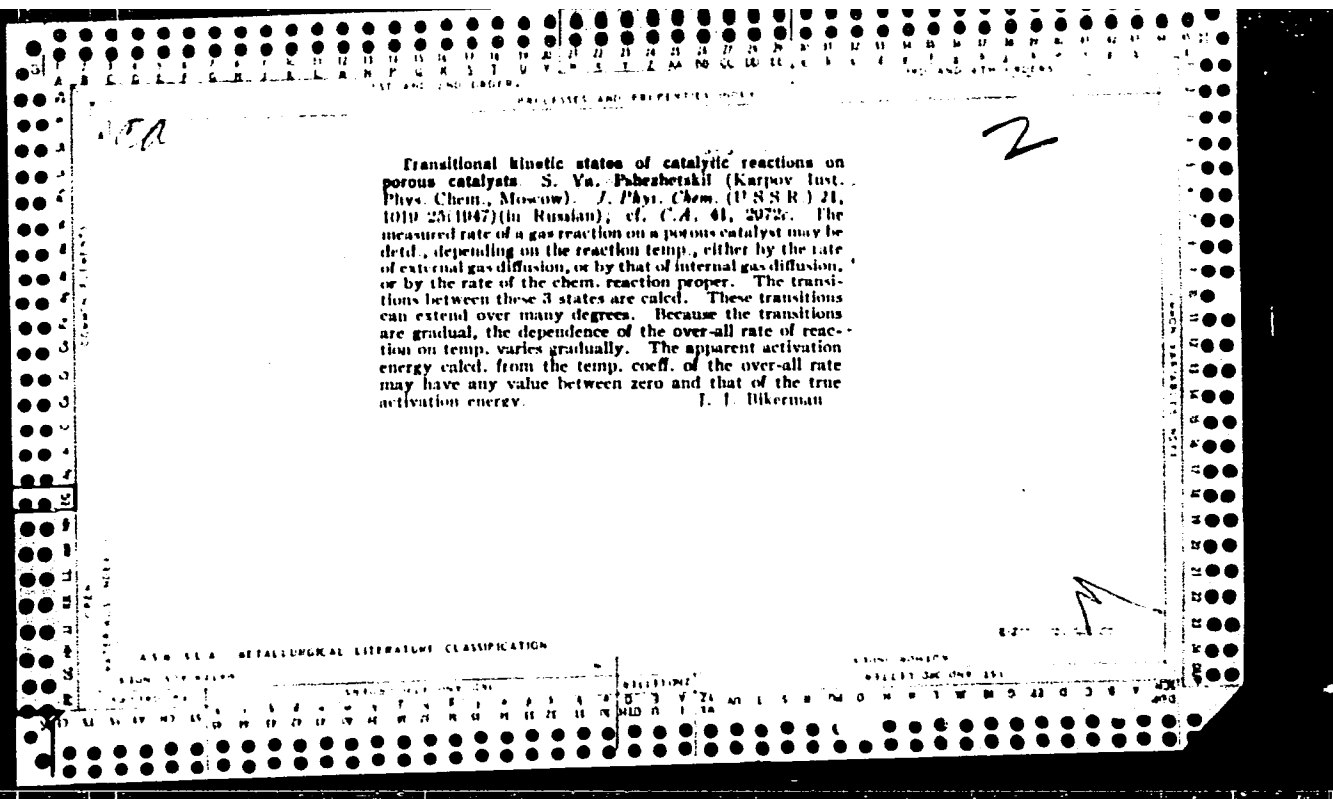
tween the observed and true rates of heterogeneous catalytic reactions. Received, 18 Mar 1946.

54T34

1ST AND 2ND SERIES		PROCESSING AND PROPERTIES INDEX		3RD AND 4TH SERIES	
2					
<p>Tonkin, M. Y., and Fubshchikov, S. I.: Stornik rabot po fizicheskoi khimii. Moscow: Acad. Sci. S.S.S.R. 1947. 427 pp.</p>					
<p>ASS-5.5 METALLURGICAL LITERATURE CLASSIFICATION</p>					
1ST AND 2ND SERIES		3RD AND 4TH SERIES		5TH AND 6TH SERIES	
1ST AND 2ND SERIES		3RD AND 4TH SERIES		5TH AND 6TH SERIES	

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p>2</p> <p>Theory of the dynamic method of measuring the rates of gas reactions. S. Ya. Pshenetskii and R. N. Rubinshteyn (Karpov Inst. Phys. Chem., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 21, 440-57(1947)(in Russian).—The equation for the kinetics of a reaction taking place in a gas stream can be found if the original concns. in the gas are varied within wide limits, if the rate of streaming is varied (this is necessary for reactions involving vol. changes), and if the concn. of a component is varied and the ratio of all the other concns. are kept const. J. J. Bikerman</p>																			
<p>ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																			
FROM STEINSLAH										FROM SCHMIDT									
1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
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11T AND 11P GROUPS										11Q AND 11R GROUPS										11S AND 11T GROUPS										11U AND 11V GROUPS									
PROCESSING AND PROPERTY INDEX																																							
2																																							
<p>A formal theory of conjugated (complex) reactions. S. Ya. Fikhshteyn and R. N. Rubinshtein (Karpov Inst. Phys. Chem., Moscow). <i>J. Phys. Chem. (U.S.S.R.)</i> 21, 650-73(1947)(in Russian).—If several reactions of the 2nd and higher orders take place simultaneously or in succession, the kinetic equations cannot be solved. How- ever, a determinant can be built up that shows the ratios of the concn. of the substances present; when the process is adiabatic, the temp. must be treated as a component of the system. J. J. Bierman.</p>																																							
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																							
FROM STYRENE										FROM BOWING										FROM BOWING										FROM BOWING									
GROUPS 1-10										GROUPS 11-20										GROUPS 21-30										GROUPS 31-40									



ROGINSKIY, V.A.; KILIN, A.G.; INDEZRETSKIY, S.Ya.

Mechanism of the nonadditive formation of radicals in the radiolysis
of frozen $\text{CCl}_4 + \text{CH}_3\text{OH}$ solutions. Dokl. AN SSSR 163 no.6:1433-1436
(MIRA 18:8)
Ag '65.

1. Fiziko-khimicheskiy Institut im. L.Ya.Karpova. Submitted January
29, 1965.

PSHEZHETSKIY, S. Ya.

4

The kinetics of diffusion on porous catalysts. S. Ya. Pshezhetskii and R. N. Rubinshtein. *Problemy Kinetiki i Kataliza, Akad. Nauk S.S.S.R. 6, Geterogennyi Kataliz* 420-31(1949).—The problem of the diffusion kinetics on a porous catalyst is discussed. The case of porous catalysts differs from the kinetics on other catalysts because of the necessity of using averaged values for the rate and diffusion consts. Equations are given relating the reaction rate to concn. and surface temp. The need for a detailed study of the phenomena, the pore statistics being considered, is stressed.
J. Rovina Leach

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PSHEZHETSKIY, S. Ya.

1/ Dynamics of complex (simultaneous) catalytic reactions.
S. Ya. Pshezhetskii. *Problemy Kinetiki i Kataliza*, Akad. Nauk S.S.S.R. 6, *Geterogennyi Kataliz* 432-42 (1940). -- The
dynamics of complex reactions that consist of either a series
of consecutive elementary stages or of a no. of reactions
occurring simultaneously are discussed. The dynamics for
these complex systems are described on the basis of the
kinetics of each individual reaction. The form of the indi-
vidual kinetic rule and the kinetic const. depends on all of
the reactions. General equations are derived to describe
the kinetics of such complex reactions. J. R. L.

MA gen

PSHEZHETSKIY, S. YA.

PA 47/49T14

USSR/Chemistry - Isopropanol
Chemistry - Oxidation

Feb 45

"Kinetics of Oxidizing Isopropanol in Acetone
Using a Silver Catalyst," S. Ya. Pshezhetskiy,
S. A. Kamenetskaya, Physicochem Inst imeni L. Ya.
Karpov, Moscow, 20 pp

"Zhur Fiz Khim", Vol XXIII, No 2

Reaction occurs without formation of molecular
hydrogen, i.e., not according to dehydrogenating
mechanism. In the first stage reaction speed is
proportional to oxygen concentration when there
is an oxygen deficiency in the stoichiometric
relation, and to isopropanol concentration
when there is an excess of oxygen. Submitted
28 Apr 48.

47/49T14

CA

Kinetics of the oxidation of hydrogen at a silver catalyst. S. Ya. (Shchegolev) and M. L. Viorovits (Karpov Inst. Phys. Chem., Moscow). *Zhur. Fiz. Khim.* 36, 353-55 (1960); cf. C.A. 49, 8272c. — Mixts. of H_2 and O_2 were passed through a silver gel (particle size 2-3 mm.) charged with 1.1% Ag (from $AgNO_3$), and the degree of transformation was determined by measuring the air current behind the catalyst and the amt. of O in it (with pyrogallol). From the assumption that the reaction takes place when a H_2 mol. collides with adsorbed O, that the rate of desorption of O is small compared with the rate of reaction, and that the adsorbed O capable of reacting is energetically uniform, the equation was derived $\alpha = \ln(1 - \alpha) = k_1 SX/v$; SX is the vol. of voids in the catalyst (about 5 cc.) and v is the rate of gas flow (cc./sec.). This equation was valid in the present expts. The const. k was independent of v (0.4-1.8) and increased with temp. from 0.0023 at 95° to 0.02 and 0.08 at 145° and 192°, resp.; hence the energy of activation was 11,700 cal. The const. $k = k_1 k_2 / (k_1 + k_2)$ (I); k_1 and k_2 are the rate consts. of the adsorption and of the reaction between O and H_2 . They could be calcd. from expts. at a const. v. in which the ratio O_2/N_2 varied from 1:9 to 8:2. At 145°, 170°, and 192° k was 0.007, 0.009, and 2.46, and k_1 was 0.040, 0.050, and 1.06, resp. These values confirm equation I. The energy of activation was for adsorption 15,000 and for reaction 8000 cal. Because k_1 and k_2 are of the same order of magnitude, the apparent order of reaction depends on the ratio O:H and the reaction appears independent of the concn. of the component present in excess (cf. Benton and Kigin, C.A. 33, 1541). No poisoning by H_2O appeared in the present expts. because of high temp. J. I. R.

CA

Kinetics of methanol oxidation to formaldehyde on a silver catalyst. I. N. Vladavets and S. Ya. Pukhovskii (L. Ya. Karpov Phys.-Chem. Inst., Moscow). *Zhur. Fiz. Khim.* 25, 612-23 (1951).—The kinetics of the oxidation of H_2 (C.A. 44, 6712f) and of $iso\text{-}PrOH$ (C.A. 45, 5272e) on a Ag catalyst suggest that the oxidation of $MeOH$ (m) on the same catalyst proceeds not through preliminary dehydrogenation of the alc. but through direct oxidation by adsorbed O_2 . This is verified by a kinetic investigation of this reaction in a flow system using small Ag spheres (2 mm. diam.), between 321 and 517°, at various flow rates v (cc./sec.), and with different initial concns. (superscript 0). The reaction products are: CH_2O , CO_2 , H_2 , and H_2O . Small amts. of CO are detected. No CH_4 is formed. At 302°, with $(C_0^0/C_0^1) = 2$, between $v = 0.97$ and 12.08, the relation $-dC_0/dt = hC_0$ (and thus $-v \ln(1 - \alpha) = h$) is obeyed, with $h \approx 0.77$ (α = degree of conversion, e.g. for h ; $\alpha = (C_0^0 - C_0)/C_0^0$). The apparent activation energy is about 16 kcal./mole. The data are interpreted by the following scheme: $O_2 + Ag \rightarrow Ag[O_2]$ (1); $CH_3OH + Ag[O_2] \rightarrow CH_2O + H_2O + Ag$ (2); $CH_2O + Ag[O_2] \rightarrow CO_2 + H_2 + Ag$ (3); $H_2 + Ag[O_2] \rightarrow H_2O + Ag$ (4). On the assumptions that (a) reactants (except O_2) and products are not adsorbed, (b) O_2 chemisorption is rate-determining, (c) the rate of desorption of O_2 is small compared with its reaction rate with reactants or intermediate products (i.e., no Langmuir adsorption equil. is realized during the reaction), (d) the oxidation reactions are irreversible, a series of theoretical curves is calcd. relating the various α values with each other and with v . Good agreement with the exper. data suggests the correctness of the proposed mechanism.

Michel Boudart

PSHEZHETSKIY, S. Ya.

USSR/Chemistry - Physical chemistry

Card 1/1 : Pub. 147 - 13/21

Authors : Pshezhetskiy, S. Ya.; Lyubarskiy, G. D.; Shcheglova, N. A.; and Merilyaynen, S. K.

Title : Relation between the kinetics of catalytic dehydrogenation of hydrocarbons and the structure of the latter. Part 3.- Comparison of kinetics data for n-butane and n-butylene; probable mechanism of dehydrogenation reaction

Periodical : Zhur. fiz. khim. 8, 1458-1464, Aug 1954

Abstract : The difference between the reaction of n-butane and n-butylene dehydrogenation kinetics and the reaction of these hydrocarbons with the catalyst was established by comparing kinetics data. The presence of a double C=C bond in the butylene molecule was considered to be the basic cause for a more intensive reaction of this hydrocarbon in comparison with that of n-butane. The formation of intermediate surface compounds of the adsorbed radical type and consequent separation of the second H-atom was thought to be the most probable reaction mechanism. Three references: 2-USSR and 1-USA (1948-1954). Tables; graphs.

Institution : The L. Ya. Karpov Physico-Chemical Institute, Moscow

Submitted : November 13, 1953

PSHEZHETSKIY, S. Ya.

USSR/Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 14/25

Authors : Lyubarskiy, G. D., Merilyaynen, S. K., and Pshezhetskiy, S. Ya.

Title : Kinetics of dehydrogenation of n-butane

Periodical : Zhur. fiz. khim. 28/7, 1272 - 1279, July 1954

Abstract : The kinetics of dehydrogenation reaction of n-butane over an aluminum-chromate catalyst, was investigated at 460 - 500° and partial butane pressures of 0.1 - 1 atm. Equation, describing the kinetics of the dehydrogenation reaction, is presented. The activation energy of the dehydrogenation reaction was established at $40,000 \pm 1,000$ cal./mol. The reduction in the rate of butane dehydrogenation, due to the addition of butylene and H, is presented graphically. The inhibiting effect of H and butylene, is explained. Five references: 3 USA; 1 English and 1 USSR (1944 - 1954). Tables.

Institution : The L. Ya. Karpov Physico-Chemical Institute, Moscow

Submitted : November 13, 1953

PSHEZHETSKIY, S. Ya.

USSR/ Chemistry Physical chemistry

Card : 1/1 Pub. 147 - 15/25

Authors : Shcheglova, N. A., and Pshezhetskiy, S. Ya.

Title : Kinetics of dehydrogenation of n-butylene

Periodical : Zhur. fiz. khim. 28/7, 1280 - 1285, July 1954

Abstract : The kinetics of butylene dehydrogenation reaction over an aluminum-chromate catalyst, was investigated at 450 - 500° and partial butylene pressures of 0.05 - 0.3 atm. Equation, describing this dehydrogenation reaction kinetics, is given. The thermal effect of this reaction, as result of conjugation of double bonds, is ~ 26000 cal./mol., i.e., somewhat lower than the thermal effect of butane dehydrogenation reaction. The effect of butadiene additions on the rate of butylene hydrogenation, is explained. Two USSR references (1946 and 1954). Tables; graphs.

Institution : The L. Ya. Karpov Physico-Chemical Institute, Moscow

Submitted : November 13, 1953

PSHEZHETSKIY, S. Ya.

USSR.

7 Dependence of the kinetics of catalytic dehydrogenation of hydrocarbons on their structure. III. Comparison of kinetic data for butane and butylene; probable mechanism of dehydrogenation reactions. S. Ya. Pshezhetskiy, G. D. Lyubarskiy, N. A. Shcheglova, and S. K. Merilialnen (I. Yu. Karpov Phys.-Chem. Inst., Moscow). *Zhur. Fiz. Khim.* 28, 1458-64 (1954); *J. C.A.* 49, 7937a. — The catalytic dehydrogenation of butane (I) and butene (II) is discussed on the basis of data reported earlier (*loc. cit.*). The greater vigor of the reaction of II with the catalyst is due to the presence of the C:C bond. The reaction proceeds through formation of intermediate surface compds. such as adsorbed free radicals, followed by removal of a 2nd H atom. Kinetic equations are derived on the assumption that the catalyst surface is effectively homogeneous; they are in accord with expt. J. W. Lowenberg, Jr.)

62

3

PSHEZHETSKIY, S. Ya.

Category: USSR / Physical Chemistry - Photochemistry. Radiation
Chemistry. Theory of the Photographic Process

B-10

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30080

Author : Myasnikov I. A., Pshezhetskiy S. Ya.

Inst : Academy of Sciences USSR

Title : Desorption of Oxygen from ZnO by the Action of Light and Its Effect
on Photoconductivity

Orig Pub: Dokl. AN SSSR, 1954, 99, No 1, 125-128

Abstract: Study of dark-conductivity and photoconductivity of ZnO, in vacuum and in the presence of O_2 , has shown that O_2 by becoming adsorbed at the surface of microcrystals of ZnO, due to capture of conductivity electrons, alters substantially its dark- und photoconductivity. On illumination of ZnO ther occurs, in the region of natural absorption (3600 Å), a considerable increase of conductivity in comparison with photoconductivity of ZnO in vacuum. It is shown, in the paper, that this effect is not associated with heating of ZnO and can be attributed only to a process of desorption of O_2 under the influence of

Card : 1/2

-1-

Category: USSR / Physical Chemistry - Photochemistry. Radiation
Chemistry. Theory of the Photographic Process

B-10

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30080

light (photodesorption). This assumption is confirmed by a specific experiment with two films of ZnO at one of which O_2 is adsorbed. On illumination in vacuum of the film with adsorbed O_2 at its surface, a considerable increase of its electric conductivity takes place, while the conductivity of the second film, which is maintained in the dark, decreases. Since photodesorption of O_2 is observed in the region of natural absorption of ZnO, the assumption is made that the mechanism of photodesorption, apparently, consists in a transmission of excitation through the lattice to the adsorption centers.

Card : 2/2

-2-

Pshezhetskiy, S. Ya.
USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 24/40

Authors : Myasnikov, I. A., and Pshezhetskiy, S. Ya.

Title : Study of the connection between the catalytic and semi-conductive properties of ZnO.

Periodical : Dok. AN SSSR 99/2, 277-279, Nov 11, 1954

Abstract : The electrical conductivity and catalytic activity of ZnO were investigated parallel during the dehydrogenation of isopropyl alcohol which, as is known, leads to the formation of acetone. The effect of oxygen on the catalytic activity of ZnO in hydrogen and in nitrogen atmosphere, regardless of the reducing effect of hydrogen, is debated. Data regarding the changes in electrical conductivity during the presence and absence of oxygen are tabulated. The effect of temperature, on the above mentioned properties of ZnO, is explained. The existence of a symbiosis between the changes in electr. conductivity and catalytic activity of ZnO was established. One USSR reference (1953). Graphs.

Institution : The L. Ya. Karpov, Physico-Chemical Institute

Presented by : Academician V. A. Kargin, June 14, 1954

PSHEZHETSKIY, S. Ya.,
LUR'YE, G. E., redaktor; BORESKOV, G. K., redaktor; NABEREZHNYKH, M. Ye.,
redaktor; PSHEZHETSKIY, S. Ya., redaktor; SLIN'KO, M. G., redaktor;
TEMKIN, M. I., redaktor; CHEREDNICHENKO, V. M., redaktor; SHPAK, Ye. G.,
tekhnicheskii redaktor

[Heterogeneous catalysis in the chemical industry; papers from the
All-Union Conference, 1953] Geterogennyi kataliz v khimicheskoi
promyshlennosti; materialy Vsesoiuznogo soveshchaniia 1953 goda.
Moskva, Gos. nauchno-tekhn. izd-vo khim. lit-ry, 1955. 494 p.

(MLRA 9:2)

1. Russia (1923- U.S.S.R.) Ministerstvo khimicheskoy promyshlen-
nosti. (Catalysis)

FSHEZHITSKIY, S. Ya.

"Some Regularities of the Mechanism and Kinetics of Simple Radiation-Chemical Reactions".

Physicichemical Institute Imeni Karpov

Report appearing in 1st Volume of "Session of The Academy of Sciences USSR On the Peaceful Use of Atomic Energy, 1-5 July 1955", Publishing House of Academy of Sciences USSR, 1955.

SO: Sum 728, 28 Nov 1955.

PSHEZHETSKIY, S. Ya.

1230

✓Some regularities of the mechanism and kinetics of simple radiation-chemical reactions (formation of ozone and the oxidation of nitrogen). S. Ya. Pshezhetskiy. *Sessiya Akad. Nauk S.S.S.R. po Mirnoy Tipol'skoy Atomnoi Energii* 1955, Zarubezhnyy Otdel. Khim. Nauk, 64-78. —The reactions for the formation of O_3 and the oxidation of N by means of γ -radiation and 200-300-e.v. or 10-400-e.v. electrons are studied to det. the relation between the processes of ion formation and the excitation of mols. and the kinetics and mechanism of radiation reactions. It is shown that irradiation of liquid O or O-N mixts. yields ~ 15 mols. O_3 /100 e.v. of absorbed energy and ~ 1.5 mols. N oxides/100 e.v. The rate of oxidation of N in the gaseous phase under electron impact is proportional to the partial pressures of the gases. The oxidation reactions are initiated by the ionization of N and the ionization of O is not significant. However, the excitation of O and dissociation into atoms is of prime importance in the formation of O_3 . J. Rovtar Leach

1230

PSHEZHETSKIY, S.Ya.

✓ The formation of ozone in liquid oxygen by the action of fast electrons. S. Ya. Pshezhetskii, I. A. Myasnikov, and N. A. Bunev. *Sbornik Rabot Radiatsionnoi Khim., Akad. Nauk S.S.S.R.* 1955, 133-41. —Ozone is formed by bombarding liquid O with 100-200 k.v. electrons or by γ -radiation from Co⁶⁰. The amt. of O₃ formed was detd. as functions of the time and intensity of irradiation. The relation between intensity of radiation and amt. of O₃ produced is linear. The amt. of O₃ formed increases with increasing time of irradiation at 1st, but after about 40 min. a stationary state is reached, at which point the yield is approx. 6×10^{-3} moles or 4.5 mole percent. For a 10-min. irradiation, the yield of this reaction is evaluated as 5 to 12 mol. O₃ per 100 e.v. of absorbed energy. Dlg. the O with N does not have any effect on the formation of O₃. The mechanism of the O₃ formation is discussed.

J. Rovtar Leach

PM

PSHEZHETSKII, S. YA.

7 2

Surface compounds in heterogeneous catalysis. S. Ya. Pshezhetskii. *Geterogennyye Katalizy v Khim. Prom.* (Moscow: Gosudarst. Nauch. Tekh. Izdatel. Khim. Lit.) Sbornik 1955, 158-78; *Russk. Zhur., Khim.* 1956, Abstr. No. 32012. —The kinetics of catalytic reactions is detd. by the regularities of formation and destruction of surface compds. In the general case the elementary stages of catalysis take place with a measurable velocity and are not in partial equil. The most general method of treatment of kinetics of the catalytic reactions is the method of stationary concns. of surface compds. V. S. Mihajlov.

929

MYASNIKOV, I.A.; PSHEZHETSKIY, S.Ya.

Light-induced desorption of zinc oxide and its effect on photo-conductance. Probl.kin.i kat. 8:34-39 '55. (MLRA 9:5)

1. Fiziko-khimicheskiy institut imeni L.Ya. Karpova.
(Zinc oxide) (Desorption) (Photochemistry)

PSHEZHETSKIY, S. Ya.

✓ The connection between the catalytic and the semi-conductive properties of zinc oxide. I. A. Myasnikov and S. Ya. Pshchetskiy. *Problemy Kinetiki i Kataliza, Akad. Nauk S.S.S.R.* 8, 175-9 (1955).—A partial report on expts. made without conclusions. Iso-PrOH was evapd. between 60 and 64° and passed over ZnO at 250-300°. The cond. of the ZnO in the reaction zone was measured as a function of temp. The gas surrounding the ZnO has a great effect; in an atm. of pure H the cond. remains const. at a high value from 570 to 640°K., whereas in a mixt. of 97% H + 3% O the cond. always is much lower, but is distinctly a function of the temp. Also the yields of acetone vary greatly, both in abs. amts. and with temp., if the iso-PrOH is carried over the catalyst in a stream of N, or with a mixt. of 99.6% N + 0.4% O, and 97.7% N + 2.3% O. Passing the iso-PrOH over the catalyst with H or 97% H + 3% O will affect the yield of acetone too. The cond. of the ZnO in the reaction zone as a function of the temp. differs in N, where it rises with increasing temp., from the one found in 97.7% N + 2.3% O, where it is extremely low and hardly changes with temp.

Werner Jacobson

(1)

BONCH-BRUYEVICH, V.L.; YELOVICH, S.Yu.; ROGINSKIY, S.Z.; VOL'KENSHTEYN,
F.F.; MATVEYEV, K.I.; PSHEZHETSKIY, S.Ya.; LYASHENKO, V.I.

Discussion. Probl.kin.i kat. 8:198-205 '55.

(MLRA 9:5)

1. Moskovskiy elektrotekhnicheskiy institut svyazi (for Bonch-Bru-
yevich); 2. Institut fizicheskoy khimii AN SSSR (for Yelovich,
Roginskiy, Vol'kenshteyn); 3. Fiziko-khimicheskiy institut imeni
L.Ya. Karpova (for Matveyev, Pshezhetskiy); 4. Institut fiziki
AN Ussr (for Lyashenko).
(Catalysis) (Electrons)

AF701597

TREASURE ISLAND BOOK REVIEW

AID 829 - S

PSHEZHETSKIY, S. YA. (Physical Chemistry Institute im. L. Ya. Karpov)
DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza
(Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo
Akademii Nauk SSSR, 1955. Section III: Connection between the
electric conductivity and catalytic activity of semiconductors.
p. 204-205.

The experimental data available at the present time do not make possible a quantitative confirmation of any regularities established theoretically. A certain correlation between the catalytic activity and conductivity of semiconductors was observed, but no quantitative dependence has been established as yet. It can be assumed that change in the properties of the surface affects the space properties of ZnO and that this effect is due to diffusion. Pshezhetskiy believes that Roginskiy's assumption that the effect of traces of O₂ on ZnO corresponds to promotion of the catalyst is incorrect. The mechanism of this phenomenon is quite different.

1/1

PSHEZHETSKIY, S.Ya.

✓ Kinetics of the nitrogen oxidation reaction by electron collision. S. Ya. Pshchetskii and M. T. Dmitriev. *Doklady Akad. Nauk SSSR* 103, 647-60 (1955). The electron-collision method was used in the study of the N-oxidation reaction kinetics in an app. consisting of a semi-electrode electron tube. The electrons were emitted from a direct-heated cathode, and were deflected by a modulator into the orifice of the anode diaphragm. The electron-ray current was directed from the collector into an ionization chamber with electrodes for the positively and negatively charged particles. The app. was calibrated by the Ne-ion appearance potential. The vessel was immersed in liquid O or N to sep. the reaction products, and the reaction rate was calcd. from the pressure drop in the vessel. The oxidation reaction on the glowing cathode was negligible. The oxidation rate of N at different pressures of the component gases can be expressed by an equation for reactions of the 2nd order, $V = kP_N P_O$, and a linear relation was found between the reaction rate and the gas pressure. Between 0 and 1.5 ma. the reaction rate is directly proportional to the elec. current intensity. The reaction rates were measured between 10 and 400 e.v. of electron energy, and were proportional to the N-ion concn. W. M. Sternberg

CH

① pm

13.11.74.15.14.5.14.
USSR/Physical Chemistry/ Electrochemistry.

B-12

Abs Jour : Ref Zhur - Khimiya, No 7, 1957, 22509.

Author : I. N. Pospelova, A. A. Rakov, S. Ya. Pshezhetskiy.

Inst : Not given

Title : Electrochemical Study of Properties of Surface Compounds of Oxygen on Silver.

Orig Pub : Zh. fiz. khimii, 1956, 30, No 7, 1433-1437.

Abstract : Silver oxygen compounds produced 1) by action of gaseous O_2 at 250° on Ag and 2) in process of theylene oxydation on Ag, which is used as a catalyzer, were studied by method of plotting of charge curves (CC) in 0.1 n KOH. Cathodic CC for electrochemically oxidized Ag are linear in first approximation, which indicates a non-heterogeneity of energy of Ag oxides produced in these conditions. Supplementary oxidation of electrochemically oxidized Ag by methods 1 and 2 brings about a formation of an important amount of a determined composition: CC of such an Ag has a big horizontal zone corresponding to an oxide reduction of $\sim +1.1$ v (on a horizontal hydrogen electrode). Ag with a sufficiently homogeneous surface after a supplementary oxidation by methods 1 and 2 is characterized by

Card 1/2

-175-

PSHEZHETSKIY, S. Ya

✓
The relation between the catalytic properties of zinc oxide and sulfide with their luminescence. L. N. Shekhter, I. A. Myasnikov, and S. Ya. Pshchetskiy (L. Ya. Karpov Phys. Chem. Inst., Moscow). *Doklady Akad. Nauk S.S.R.* 109, 1163-6 (1950). — The catalytic properties of pure (autoactivated) ZnO with varying luminescence properties, obtained by the oxidation with pure O at varying temp. and pressure of thin Zn films upon polished quartz plates, were studied in the $\text{MeOH} \rightarrow 2\text{H}_2 + \text{CO}$ reaction at 250-345°, and at 120-225 mm. pressure. The results indicate a direct relation between the catalytic and optical properties in the reaction studied. The quant. difference in the luminescence extinction (several %) and the reduction in cond. (several fold) by O adsorption probably resulted from screening the cond. electrodes.

W. M. Sternberg

AM
MT

fra

PSHOZHETSKY, S. Ya. (Prof.)

"The Oxidation of Nitrogen Under Ionizing Radiations."

report presented at Scientific Conference at the Inst. for Physical Chemistry
imeni L. Ya. Karpov, Acad. Sci. USSR, Nov 1957.

PSHEZHETSKIY, Samuil Yakovlevich

PHASE I BOOK EXPLOITATION

251

Pshezhetskiy, Samuil Yakovlevich, Dr. of Chem. Sciences, Prof.

Ispol'zovaniye yadernoy energii dlya khimicheskikh protsessov (Use of Nuclear Energy for Chemical Processes) Moscow, Izd-vo "Znaniye", 1957. 30 p. (Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy. Seriya VIII, 1957, no. 47) 43, 500 copies printed.

Ed.: Faynboym, I. B.; Tech. Ed.: Gubin, M. I.

PURPOSE: This popular pamphlet about radiochemistry^{is} for the reader of popular scientific literature.

COVERAGE: This pamphlet gives a brief account of progress in radiochemistry. The effect of nuclear radiation on molecules and problems of the simplest organic and inorganic radiochemical reactions are discussed. Chain radiation processes are also covered. One chapter is devoted to the effect of radiation on solids. The great contribution of Soviet scientists to radiochemistry is stressed.

Card 1/2

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Effect of nuclear radiation on molecules	4
Effect of radiation on the energy of chemical reactions	10
Elementary secondary processes	14
Radiochemical reactions of inorganic substances	16
Radiochemical reactions in aqueous solutions and electroradiochemical processes	18
Radiochemical reactions of organic substances	21
Characteristics of radiochemical chain reactions	24
Effect of radiation on solids	26
Sensitization and inhibition of radiochemical reactions	28

AVAILABLE: Library of Congress

Card 2/2

EW/gmp
May 26, 1958

PSHEZHETSKIY, S. YA.

89-10-21/36

AUTHORS

Pshezhetskiy S.Ya., Dmitriyev, M. T.

TITLE

Nitrogen Fixation by Ionizing Radiation.

(Fiksatsiya azota pri deystvii ioniziruyushchikh izlucheniya-Russian)

PERIODICAL

Atomnaya Energiya, 1957, Vol 3, Nr 10, pp 350-352 (U.S.S.R.)

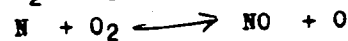
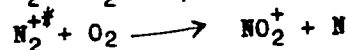
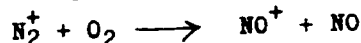
ABSTRACT

The rules applying in the case of the oxidation of nitrogen under the influence of electron collisions and β -radiation were determined experimentally. A 2 KV electron valve, a 200 kV linear accelerator and a 1400 C Co-60 source were used as radiation source. The oxidation velocity in dependence on the radiation dose, on gas composition, on gas pressure and gas temperature were especially investigated and the relation: $V = K \cdot P_{N_2} \cdot P_{O_2}$ applies. For an electron shock up to 100 eV the process:

$N_2 \rightarrow N_2^+ + e(N_2^{++} + e, N_2^{++} + 2e)$ is about 10 times as probable as the process:

$N_2 \rightarrow N^+ + N + e(N^+ + N^+ + e, N^+ + N^+ + e)$

The most important reactions observed are:



Card 1/2

Tabularly the reaction yields are given in molecules NO_2 per 100 eV

Nitrogen Fixation by Ionizing Radiation. 89-16-21/36
for the various radiators at various values of pressure and tem-
peratures.
There are 1 table and 4 Slavic references.

SUBMITTED
AVAILABLE
Card 2/2

May 20, 1957
Library of Congress.

PSHEZHETSKIY S.Ya.

48-5-10/56

SUBJECT: USSR/Luminescence

AUTHORS: Shekhter L.N., Myasnikov I.A., and Pshezhetskiy S.Ya.

TITLE: Investigation of a connection between Luminescence, Catalytic and Adsorption Properties of "Self-activated" Crystals of ZnO and ZnS (Issledovaniye svyazi mezhd lyuminesentsiyey, kataliticheskimi i adsorbtsionnymi svoystvami "samoaktivirovannykh" kristallov ZnO i ZnS)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #5, pp 664-666 (USSR)

ABSTRACT: The connection between luminescent, catalytic and adsorption properties of thin films and highly dispersed powders of pure ZnO and ZnS was investigated.

The process of catalytic dissociation of methanol on ZnO has a reducing effect on the catalyzer by increasing the concentration of surplus Zn on the surface, and changes correspondingly both the luminescence spectrum and catalytic activity. The quenching of ZnO-Zn and ZnS-Zn luminescence bands by oxygen and sulfur vapor respectively leads also to a reduction of catalytic activity.

Card 1/2

48-5-10/56

TITLE:

Investigation of a connection between Luminescence, Catalytic and Adsorption Properties of "Self-activated" Crystals of ZnO and ZnS (Issledovaniye svyazi mezhdu lyuminesentsiyey, kataliticheskimi i adsorbtsionnymi svoystvami "samosktivirovannykh" kristallov ZnO i ZnS)

When oxygen is adsorbed on ZnO, then both luminescence and electric conductivity are reduced.

An effect of ultraviolet light from the region of fundamental absorption manifests itself in the photodesorption of oxygen.

Catalyzers-luminophores were also subjected to neutron irradiation.

A system of ZnO.ZnS produced in a special way was studied with respect to its luminescence and catalytic properties, which differ from those of its components.

The report was followed by a discussion.

One Russian reference is cited.

INSTITUTION: Physico-Chemical Institute im. Karpov

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress

Card 2/2

Ps. hezhetskiy, S. Ye.

✓ Mechanism of some simple chemical reactions proceeding under the influence of ionizing radiations. S. Ye. Pshezhetskiy and M. T. Dmitriev. *Doklady Akad. Nauk SSSR* 20, 125-27 (1957).
Review of radiation-produced reactions involving H, H or T mixts. with CO, H-CuO, O, formation of O₂, decompn. of H₂O, decompn. of H₂O₂, CO, CO₂, N₂, N₂O₂, decompn. of N₂O, formation of NH₃, decompn. of NH₃, formation of hydrazine, decompn. of hydrazine. A brief discussion of ionization and excitation processes in these reactions is given; 215 references through 1956. G. M. Kosolapoff.

3
-RMP
-GMM
1-4E3d

RMP

PSHEZHETSKIY, S.Ya.

Kinetics of butene hydrogenation on chromium-alumina catalysts. G. D. Lyubarskii, S. K. Ermakova, and S. Ya. Pshezhetskiy (L. Ya. Karpyov Phys. Chem. Inst., Moscow); Dokl. Akad. Nauk SSSR, 31, 1492-500 (1957); Chem. Abstr. 49, 7937f. The kinetics was studied dynamically, the flow-rate and compn. of the gas mixt. being varied at const. pressure. The catalyst was treated at standardized conditions (by passing N₂ and H₂ over it at 500° for 30 min. at a const. rate, and cooling in H₂). Tests with catalyst granules of different sizes showed that with granules <1 mm., diffusional inhibition was no longer effective, and all tests were made with 0.8-0.9 mm. catalyst size at 220-400°. The exptl. reaction rate was $w = k C_H C_A^{0.5}$, where C_H and C_A are the H₂ and C₄H₆ concns. The apparent activation energy for butene hydrogenation is 10,000 cal./mol.; whereas the apparent activation energy for butane dehydrogenation is 40,000 ± 1000 cal./mol. The heat effect of the dehydrogenation reaction 40,000 - 10,000 = 30,000 cal./mol. agrees with the value found by Kistiakowsky et al. (Can. J. Chem. 29, 4254). W. M. Sternberg

Distr: 4E1j/4E2c/4E2c(1)

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3

PSHEZHETSKIY, S. YA.

20-3-39/59

AUTHORS: Chernykh, V. Ya., Pshezhetskiy, S. Ya.,
Tyurikov, G. S.,

TITLE: Kinetics of the Decomposition of Hydrogen Peroxyde Under the
Action of Gamma Rays (Kinetika razlozheniya perekisi vodoroda
pod deystviyem gamma-izlucheniya)

PERIODICAL: Doklady Akad. nauk SSSR, 1957, Vol. 115, Nr 3, pp. 560-563, (USSR)

ABSTRACT: This kind of kinetics in aqueous solutions under the influence of
ionizing radiation has been investigated in a number of papers,
which, however, show differing results in many respects. This can
apparently be traced back to the circumstance, that measurements
have been executed at different and narrowly limited concentra-
tions of H_2O_2 and, in general, in diluted solutions. It was inte-
resting to clarify, to what extent actual kinetic laws depend on
the range of concentration, in which the measurements have been
executed. Of special interest were the kinetics of this reaction
in concentrated solutions. The aforementioned kinetics were inve-
stigated in the wide range from 2 to 92 Mol H_2O_2 . Co^{60} served as
a source for γ -radiation with an activity of 80 Curie and a mer-
cury lamp PRK-2 as a source for ultraviolet radiation. The radia-
tion intensity was varied by altering the distance from the radia-
tion source. Kinetic of the reaction, initiated by γ -radiation:
Fig 1 shows how the reaction velocity depends on the concentra-
tion of H_2O_2 . From it can be seen, that this velocity as a function

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20-3-39/59

Kinetics of the Decomposition of Hydrogen Peroxyde Under the
Action of Gamma Rays.

of the H_2O_2 concentration passes through a maximum at all temperatures. The velocity is proportional to the root from the radiation intensity at all concentrations (1,78-92,23 Mol). The dependency of the decomposition velocity on the temperature (+50, 30, 10, 10, -4, -11, -210 and -300). A linear dependency $lgW(1/T)$ exists in the case of all solutions. At above 10°C this straight line shows a bend. The precipitation of oxygen increases above 100, if the solution is stirred. In this case the reaction velocity is covered up by diffusion. The production, calculated in relation to the energy absorbed, depends on the temperature and on the concentration and characterizes a chain process. Kinetics of thermal reaction: Below 10°C its velocity is small and hardly measurable. Fig 2 shows, that the dependency on the concentration has the same character. The average value of the activation energy amounts to $12,5 \pm 1,5$ Kcal/Mol. Kinetics of decomposition under the influence of ultra-violet radiation: Fig 3 shows the dependency on the concentration. The curve $lgW(1/T)$ has a bend at above 10°C, which can be removed by stirring. The value of the activation energy approximates the value of the reaction under the influence of γ -radiation. Equation of kinetics and the most probable mechanism of the reaction: The latter is independent of the character of initiation. Fig 4 shows, that the equation:

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Kinetics of the Decomposition of Hydrogen Peroxide Under the Action of 20-3-39/59
Gamma Rays.

$$W = - \frac{d[H_2O_2]}{dt} \sim K \sqrt{J} \sqrt{[H_2O_2]} [H_2O]$$

can be complied with. There is a satisfactory compliance with the experiment on photo- and thermo- dissoziation in every range of concentration and at all temperatures. It can be maintained, that in a number of cases the equations of the velocity of the radiation dissociation reaction in other papers represent approximations to the actual kinetic law of reaction in various limited ranges of concentration of diluted solutions of H_2O_2 . There are 4 figures and 2 Slavic references.

ASSOCIATION: Physical-Chemical Institute imeni L. Ya. Karpov (Fiziko-khimicheskiy institut im. L. Ya. Karpova)

PRESENTED BY: Academician Kargin, V. A., February 16, 1957

SUBMITTED: February 4, 1957

AVAILABLE: Library of Congress

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DMITRIYEV, M. T., PSHEZHETSKIY, S. Ya.

"The Kinetics and Mechanism of the Oxidation of Nitrogen Under Electron Bombardment" p.26

Trudy Transactions of the First Conference on Radioaction Chemistry, Moscow,
Izd-vo AN SSSR, 1958. 330pp.
Conference -25-30 March 1957, Moscow

CHERNYKH, V. Ya.. PSHEZHETSKIY, S. Ya. and TYURIKOV, G. S.

"Kinetics of Decomposition of Hydrogen Peroxide Under the Action of Gamma
Radiation" p.83

Trudy Transactions of the First Conference on Radioaction Chemistry, Moscow,
Izd-vo AN SSSR, 1958. 330pp.
Conference -25-30 March 1957, Moscow

PSHEZHETSKIY, S. Y.

PROSKURNIN, M. A., KOLOTYRKIN, Y. M. and PSHEZHETSKIY, S. Y.

"Investigations into Radiation Chemistry of Aqueous Solutions and Some Other Inorganic Systems."

paper to be presented at 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

PSHEZHETSKIY, S. Ya.

pp 7, 12, 13, 14, 15

PHASE I BOOK EXPLOITATION

790

Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk

Deystviye ioniziruyushchikh izlucheniya na neorganicheskiye i organicheskiye sistemy (Effect of Ionizing Radiation on Inorganic and Organic Systems)
Moscow. Izd-vo AN SSSR, 1958. 416 p. 7,000 copies printed.

Resp. Ed.: Pshezhetskiy, S. Ya.; Ed. of Publishing House: Bugayenko, L.T.;
Tech. Ed.: Prusakova, T. A.

PURPOSE: This publication is for scientists working in the field of radiochemistry.

COVERAGE: This collection of articles represents contributions of Soviet scientists in the field of radiochemistry. The papers are concerned with the effect of ionizing radiation on organic and inorganic substances in solutions and in the solid phase. These papers were completed in the years 1951 - 1956 at the Institute of Physical Chemistry, AS USSR, the Institute of Physics and Chemistry imeni L. Ya. Karpov, the Moscow State University, and other scientific institutions. Most of these works are a continuation of those published in "Sbornik rabot po radiatsionnoy khimii" published in 1955. Ts. I. Zalkind and Yu. M. Malinskiy cooperated in the editing of this symposium.

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Effect of Ionizing Radiation (Cont.)

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TABLE OF CONTENTS:

PART 1. REACTIONS IN AQUEOUS SOLUTIONS
AND RADIATION AND ELECTRO-CHEMICAL PROCESSES

Preface

Duzhenkov, V.I., Dolin, P.I. Effect of X-ray Irradiation on Aqueous Alkali Solutions Saturated With Oxygen

7

The kinetics of accumulation of molecular products formed in the radiolysis of water are studied in this paper. These products are: hydrogen peroxide and hydrogen. The absorption of oxygen in high-purity alkali solutions saturated with oxygen was also taken into consideration. It was determined that the initial yield of hydrogen depends on the concentration of the irradiated KOH solution only for concentrations up to 0.6 - 0.7 N KOH. The same relation was found for H_2O_2 . The material balance of the molecular products showed a strong deviation towards excessive absorption of oxygen. This fact was explained as the formation of higher peroxides, probably HO_2 or the complex $H_2O_2 \cdot HO_2$.

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Effect of Ionizing Radiation (Cont.)

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There are 4 figures and 8 references, of which 6 are Soviet and 2 English.

12

Gvozdev, B.A., Shubin, V.N. Effect of Accelerated Electrons on Potassium Permanganate Solutions

The reduction of aqueous KMnO_4 solutions by accelerated electrons in the concentration range of 10^{-3} to $3 \cdot 10^{-1}$ M is discussed in this paper. The yield of the reaction $\text{Mn(VII)} \rightarrow \text{Mn(IV)}$ is determined from the relation between the amount of reduced permanganate and the amount of energy absorbed by the solution. The authors explain the effect of the acidity of the solution (in the range $\text{pH} = 0.4$ to 12) on the rate of reduction. The maximum yield was observed for $\text{pH} = 2.05$. It was determined that the yield of reaction does not depend on the dosage rate in the range from $\sim 10^{17}$ to $\sim 10^{20}$ eV/ml·sec for electron energies from 0.1 to 0.7 Mev. There are 8 figures, 3 tables, and 7 references, of which 4 are Soviet, 2 English, and 1 Polish.

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Effect of Ionizing Radiation (Cont.)

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Sidorova, L.P., Zimin, A.V., Proskurin, M.A. Effect of Co^{60} γ -Radiation on Aqueous Solutions of Salts of Tin

22

The article deals with the effect of irradiation on SnCl_2 and SnCl_4 solutions, and the role of the salts as acceptors of the products of water radiolysis. Experimental data show that the irradiation of $1 \cdot 10^{-2}$ M solutions of Sn^{2+} in 4N HCl and in 1N NaOH results in a hydrogen yield equal to the yield of bivalent tin oxidation. The yield of hydrogen is 0.53 - 0.60 molecules/100 ev of absorbed energy. The hydrogen yield does not change with the increase of dosage in an acid medium, and decreases in an alkaline medium. The presence of bivalent tin in alkaline solutions increases the hydrogen yield, while it does not show an essential effect in an acid medium. The oxidation of $\text{Sn}^{2+} \rightarrow \text{Sn}^{4+}$ in acid and alkaline media is apparently conditioned by the interaction of Sn^{2+} with H_2O_2 molecules. There are 3 tables, 1 figure, and 14 references, of which 6 are Soviet, and 8 English.

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Effect of Ionizing Radiation (Cont.)

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29

Chernova, A.I., Orekhov, V.D., Proskurin, M.A. Oxygen Compounds of Iron Ions and Their Conversion During Radiolysis of Aqueous Solutions
This is a study of iron peroxide compounds and their behavior under γ - and ultraviolet irradiation. Variable-valence ions are considered to be carriers of the oxidizing components in radiochemical oxidation. The peroxide iron complex which forms during the irradiation of a Mohr salt solution in 4N sulfuric acid decomposes in the presence of Fe^{3+} to form bivalent ions. This process is intensified with the increase of the Fe^{3+} concentration in the solution. It was determined that the peroxide iron complex can be formed also in Mohr salt solutions in 0.8N acid when an excess of Fe^{3+} is present. Addition of $MnSO_4$, $TiNO_3$, $NaCl$, KBr , KI , $Ce(NO_3)_3$ and $CuSO_4$ to the irradiated solutions of the Mohr salt in 0.8 and 4N sulfuric acid leads to an increased yield of Fe^{3+} ions. The effect is due to the presence of bromide and iodide ions as well as Ce^{3+} and Cu^{2+} . There are 6 figures and 11 references, of which 4 are Soviet, 4 English, and 3 German.

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Effect of Ionizing Radiation (Cont.)

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Sharpatyy, V.A., Orekhov, V.D., Proskurin, M.A. Sensitization of the Radiolytic Conversion of Sodium Nitrate in Aqueous Alkaline Solutions

37

The subject of this paper is the effect of the temperature of the solution on the yield of radiolytic conversion of nitrate in aqueous alkaline solutions at temperatures from 20° to 90°. The same process was studied with glycerin as acceptor of OH radicals. An increase from 20° to 40° in 1M NaNO₃ / 1M KOH caused a sharp increase of the nitrate yield: from ~ 3.0 to ~ 6.5 equiv./100ev. The increase in yield reaches its limit value at 80° and equals about 8 equiv./100ev. The sensitizing effect of glycerin is apparent only when its concentration is ~ 5·10⁻⁴ M and remains constant for concentrations up to 10⁻³ M. The presence of molecular oxygen (air) inhibits this effect. There are 5 figures and 10 references, of which 5 are Soviet and 4 English.

Sharpatyy, V.A., Orekhov, V.D., Proskurin, M.A. Radiolytic Reduction of Sodium Nitrate in Concentrated Aqueous Solutions

43

This paper considers the radiolytic reduction of nitrate solutions in a wide range of concentrations. Concentrations of NaNO₃ above 1M in the presence of an inert gas (nitrogen) resulted in a yield of 8 to 9 equiv./100ev. It is noted that molecular oxygen inhibits the reduction.

Effect of Ionizing Radiation (Cont.)

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process, which is evident in lower results as compared to the process in an inert atmosphere. There are 2 figures and 6 references of which 3 are Soviet and 3 English.

Chernykh, V.Ya., Pshezhetskiy, S.Ya., Tyurikov, G.S. Kinetics of the Decomposition of Hydrogen Peroxide Under the Action of γ - Radiation

48

The authors studied the kinetics of H_2O_2 decomposition in a wide range of concentrations: 1.78 - 92.2 mol.%, in γ and ultraviolet radiation. The rate of the thermal reaction was also taken into consideration. The rate of the radiation reaction is proportional to the square root of γ -radiation intensity. The activation energy equals 6.5 ± 1.0 kcal/M. The activation energy of the photochemical reaction is 8 - 9 kcal/M. The efficiency of the γ -radiation reaction is 21 (at -4°) to 230 molecules of H_2O_2 (at 50°) per 100ev dosage rate of $1.84 \cdot 10^{18}$ ev/l. sec. It is a chain reaction. The kinetics of the radiation, photo, and thermal reactions can be clarified by assuming electrolytic dissociation of the HO_2 radical, the rate of which depends on the concentration of the solution. There are 20 figures, 4 tables, and

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Effect of Ionizing Radiation (Cont.)

790

22 references of which 3 are Soviet, 16 English, and 3 German.

Zalkind, Ts.I., Veselovskiy, V.I. Mechanism of Radiochemical Formation of Stationary Potential Differences in Aqueous Solutions

66

The stationary potential difference of ~ 0.9 is formed in the system $\text{Pt}/\text{H}_2\text{SO}_4$ saturated with nitrogen/Au and irradiated with Co^{60} γ -radiation. It was shown that the formation of a positive potential at the Au electrode is connected with the radiolytic formation of the OH radical. The oxidation of the electrode during heating facilitates the formation of the positive potential at the Au electrode. The rate of reduction is determined by the rate of the electrode reaction, i.e., the electrochemical discharge stage. There are 6 figures, and 6 references of which 5 are Soviet and 1 English.

Zalkind, Ts.I., Veselovskiy, V.I. Photoelectrochemical and Radiation Electrochemical Processes in Aqueous Solutions of Uranium Salts

74

Uranium salts were irradiated with radon and Co^{60} . It was shown that the hexavalent uranium salts show reduction of uranyl ions to pentavalent uranium ions. Due to the ease of oxidation - reduction transitions in the system $\text{U(VI)} / \text{U(V)}$, the increase of the uranyl ion concentration is followed by a decrease in the amount

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Effect of Ionizing Radiation (Cont.)

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of the formed H_2O_2 , uranium peroxide compounds, and in the oxidation of U(IV) and oxalic acid. Irradiation of the system U(IV) / U(VI) and U(III) / U(IV) results in a shift of equilibrium and the formation of more oxidized forms. There are 14 figures, 7 tables, and 18 references of which 8 are Soviet, 7 English, and 3 German.

Miller, I.B., Veselovskiy, V.I. Radiation Electrochemical Processes in Aqueous Solutions of Uranyl Salts

93

This is a study of the electrochemical nature of the redox components in the radiolysis of uranyl salt solutions. Certain conditions were established for the formation of the "hydrogen" and "oxygen" potentials in this system. A stationary potential of the Pt electrode develops during γ -irradiation due to the emergence of nonequilibrium concentrations of U(V). The stationary potential at the Au electrode in uranyl sulfate solutions is $\sim 1.1V$, while at the Pt electrode it shifts towards negative values. There are 9 figures and 12 references, of which 6 are Soviet and 6 English.

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15

Effect of Ionizing Radiation (Cont.)

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Rozenfeld, I.L., Oshe, Ye.K. Mechanism of Activation of Electrodes of Local Cells During Irradiation

103

This paper discusses the effect of radiation on the properties of semiconducting oxide films of the electrodes. It was determined that only irradiation of the cathode intensifies the corrosion of metals in electrolytes. This is due to the sharp increase in the cathode efficiency resulting from "radiation conductivity" in the protective film which is regarded as a semiconductor. The radiation dependence of the corrosion current is expressed by:

$$I_k = I_k^0 + A\sqrt{I},$$

where A is the constant for the given pair of electrodes. Candidate of physical and mathematical sciences V.B. Sandomirskiy participated in this work. There are 10 figures and 6 references of which 1 is Soviet, 3 English, 1 French and 1 Czech.

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15

Effect of Ionizing Radiation (Cont.)

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Duzhenkov, V.I., Dolin, P.I. Effect of X-rays on Diluted Aqueous Solutions of Organic Substances

114

The effect of organic additives on the yield of molecular products from the radiolysis of water is studied in solutions of varying acidity. It was determined that the initial yield of H_2 and H_2O_2 increases, and their fixed concentrations are lowered. This appears to be due to the fact that the radical products of radiolysis: H , OH , HO_2 react with the organic molecules more vigorously than the molecules H_2 and H_2O_2 . There are 3 figures, 2 tables, and 9 references, of which 3 are Soviet and 6 English.

Chernov, A.I., Orekhov, V.D., Proskurin, M.A. Sensitization and Inhibition of Radiolytic Reduction of the Uranyl Ion in Aqueous Solutions

120

The radiolytic reduction of uranyl ions was sensitized with glucose and glycerin, and inhibited with methylene blue. The reduction of UO_2^{2+} does not exceed 0.5 molecules/100 ev for low concentrations of the uranyl ion ($5 \cdot 10^{-3}$ M) and of glucose or glycerin ($5 \cdot 10^{-3}$ M). Concentration of 0.5 M glycerin leads to reduction of 5 molecules/100 ev. The inhibiting effect of methylene blue is modified by the ratio of concentrations of two substances reacting with H ,

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Effect of Ionizing Radiation (Cont.)

790

the product of radiolysis: for $C_{UO_2^{2+}} : C_{dye} = 1:1$ the dosage of inhibition of the dye reaches 10^{18} ev/ml and decreases with the increase of this ratio. The participation of ionized and excited molecules of water in these processes is taken into consideration. Co^{60} γ - radiation was used for irradiation. There are 3 figures and 19 references of which 8 are Soviet and 11 English.

PART 2. REACTIONS OF INORGANIC SUBSTANCES

Buneeyev, N.A., Myasnikov, I.A., Pshezhetskiy, Formation of Ozone in Liquid Oxygen Due to γ -Radiation

129

The formation of ozone in LOX due to Co^{60} radiation was studied with respect to duration and intensity of irradiation. It was found that the yield of ozone is 13.6 molecules per 100 ev of the absorbed γ -radiation energy. There are 4 tables, 3 figures, and 3 Soviet references.

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15

Effect of Ionizing Radiation (Cont.)

790

Banáyev, N.A., Pshezhetskiy, S.Ya., Myasnikov, I.A. Formation of Ozone in Gaseous Oxygen Due to Fast Electrons

133

The effect of electrons on oxygen was studied at room temperature and atmospheric pressure, under dynamic and static conditions. The determined stationary concentration of ozone equals 0.1 - 0.2 per cent for 200 Kev electrons and current of 50 - 100 μ a. This is 4 to 8 times less than for LOX under analogous conditions. The efficiency of the reaction is \sim 1.5 molecules per 100 ev. There are 9 figures, 5 tables, and 10 references, of which 3 are Soviet, 4 English, 2 German and 1 Belgian.

Dmitriyev, M.T., Pshezhetskiy, S.Ya. Radiation Oxidation of Nitrogen. Part 1. Kinetics of the Nitrogen Oxidation Reaction due to Electron Impact and the Effect of Ionization Processes

145

This paper deals with kinetics of ionization and oxidation of nitrogen due to the impact of 0 - 400ev electrons at pressures up to 0.1 mm Hg. The reaction rate is defined by an equation of the second order and the activation energy of the reaction equals 7.4 ± 1 kcal/M. The obtained data show that ionization of molecular nitrogen is the primary elementary process leading to oxidation of nitrogen, and that it is followed by direct interaction of the molecular nitrogen ion with a molecule of oxygen and the interaction

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15

Effect of Ionizing Radiation (Cont.)

790

of oxygen with products of the dissociation of the molecular nitrogen ion. There are 18 figures, 12 tables, and 27 references of which 4 are Soviet, 19 English, 3 German, and 1 Belgian.

Dmitriyev, M.T., Pshezhetskiy, S.Ya. Radiation Oxidation of Nitrogen.

Part 2. Kinetics of the Oxidation of Nitrogen Due to Fast Electrons

171

The oxidation of nitrogen due to fast electrons is studied in the gaseous phase and at atmospheric pressure. The reaction kinetics are defined by an equation of the second order. The reaction rate is proportionate to the electron flux and to the ratio of gas layer thickness to the maximum electron path in gas. At the temperature of 40° the yield is 1.3 atoms of bound nitrogen for air, and 2 atoms for a 1 : 1 gas mixture per 100 ev of absorbed energy. The differences in the absolute values of reaction rate constants are interpreted as the result of variations in the recombination of ions. There are 10 figures, 2 tables, and 9 references of which 7 are Soviet and 2 English.

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Effect of Ionizing Radiation (Cont.)

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Bol'shun, Ye.V., Pshezhetskiy, S.Ya., Myasnikov, I.A. Formation of Hydrazine in Liquid Ammonia Due to Fast Electrons

182

The formation of hydrazine due to fast electrons leads to a stationary hydrazine concentration conditioned by the balancing of the rates of direct and inverse reactions. The reaction efficiency is 1 - 1.2 molecules of hydrazine per 100 ev. There are 2 tables, 1 figure, and 6 references of which 3 are Soviet and 3 English.

Baberkina, A.S., Proskurnin, M.A., Orekhov, V.D. The Effect of γ -Radiation on Solid Potassium Nitrate

186

The γ -irradiation of potassium nitrate leads to evolution of gas and nitrite formation. The irradiated salt shows a sharp increase of gas evolution when heated to $\sim 129^\circ$. A decrease in the amount of initially formed nitrite is observed when the temperature rises above 122° (temperature of lattice destruction for KNO_3). The decrease in the nitrite yield is connected with the inverse reaction of nitrate formation which occurs due to the presence of atomic oxygen or free radicals in the irradiated salt.

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PSHEZHETSKIY, S.Ya.

Certain rules governing the kinetics and mechanism of
radiochemical reactions. Probl.fiz.khim. no.1:31-47
'58. (MIRA 15:11)

1. Laboratoriya kinetiki gazovykh reaktsiy Nauchno-
issledovatel'skogo fiziko-khimicheskogo instituta im.
Karpova.

(Radiochemistry)

AUTHORS: Gribova, Ye. I., Kameretskaya, S. A., ^{78-3-4-37/38} Pshezhetskiy, S. Ya.

TITLE: The Specific Weight of Liquid Ozone (Udel'nyy ves zhidkogo ozona)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 4, pp. 1061-1062 (USSR)

ABSTRACT: The density of liquid ozone was determined by recording the pressure by the "Ozone-Manometer".
The mean density of liquid ozone at -183°C was determined by means of a glass manometer to amount to $1,572 \pm 0,003 \text{ g/cm}^3$.
The mean density of liquid ozone at -183°C was determined by means of a sulfuric acid manometer to amount to $1,579 \pm 0,003 \text{ g/cm}^3$.
The mean value of these two determinations which are also to be regarded as the specific weight of liquid ozone amounts to $1,575 \pm 0,003 \text{ g/cm}^3$. There are 1 table and 3 references.

SUBMITTED: May 3, 1957

Card 1/1

76-32-5-27/47

AUTHORS: Kamenetskaya, S. A., Pshezhetskiy, S. Ya.

TITLE: Investigation of the Critical Conditions of the Ignition of Gaseous Ozone (Issledovaniye kriticheskikh usloviy vos-plameneniya gazoobraznogo ozona)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 5, pp.1122-1130 (USSR)

ABSTRACT: In earlier works the ignition of ozone was only investigated in the presence of hydrogen, bromine and hydrogen bromide, while in this work proof is given of the validity of the theory of thermal explosion according to N. N. Semenov also for the process mentioned in the title. From the method of the experiments can be seen that an analogous scheme to that of the work by Ya. B. Zel'dovich and N. N. Semenov (Ref 7) was used, just as well as an apparatus shown in a diagram. The ozone was obtained from an ozonizer of the Siemens type, the determinations of the function of the lower ignition area on the temperature in the interval of from -120° to $+55^{\circ}$ C and at pressures of from 8 to 220 torr being carried out.

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Investigation of the Critical Conditions of the Ignition of Gaseous Ozone 76-32-5-27/47

The function curve has a somewhat strange shape as on the one hand a catalytic decomposition of the ozone at the vessel walls can take place at higher temperatures, while at lower temperatures the ozone is absorbed at the walls. The experiments at higher pressure showed that there is apparently no upper area of ignition. The use of various inert gases showed a small influence, while steam had no influence at all, which is in agreement with the observations by Lewis and Feitknecht. The surface extension effected an increase of the pressure area, while the influence of the spark capacity on the lower area of ignition had regular character, corresponding to the data by Ref 7; thus the minimum energy of the ignition could be evaluated from the data obtained. The function of the lower area of ignition vs. the vessel diameter can be expressed by the formula $P \cdot d = \text{const.}$ where P denotes the critical ignition pressure and d the diameter. The activation energy computed according to N. N. Semenov coincides well with the data obtained, just as well as the computation of the criterion of the thermal explosion based on the equation by Frank-Kamenetskiy (Ref 9); this is a hint that the ignition of gaseous ozone is a thermal explosion.

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Investigation of the Critical Conditions of the Ignition of Gaseous Ozone ^{76-32-5-27/47}

There are 7 figures, 5 tables, and 11 references, 5 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova Moskva
(Moscow Institute of Physics and Chemistry imeni L.Ya. Karpov)

SUBMITTED: February 4, 1957
1. Ozone--Ignition 2. Ozone--Absorption
3. Ozone--Catalysis

Card 3/3

AUTHORS: Pankratov, A. V., Pshezhetskiy, S. Ya. SOV/76-32-7-23/45

TITLE: Some Rules Governing the Photochemical Decomposition of Ozone in the Liquid Phase (Nekotoryye zakonomernosti fotokhimicheskogo razlozheniya ozona v zhidkoy faze)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 7, pp. 1605 - 1611 (USSR)

ABSTRACT: Since the quantum yield in the photochemical decomposition of ozone in the gaseous phase only little exceeds a value of 2, the problem concerning the role played by the chain mechanism in this reaction may not be regarded as completely clear. As in the liquid phase there exist conditions more favorable for the transfer of the excitation energy between the molecules, as may also be seen from the data supplied by S.Ya. Pshezhetskiy, I. A. Myasnikov and N.A. Buneyev (Ref 2), the authors of the present paper carried out only some comparative experiments in the gaseous phase. The measurements were carried out by dilatometric methods with two types of apparatus being used, diagrams of which are given. The experiments were carried out at 183°C, a quartz lamp PRK-2 served as light source with cobalt and

Card 1/3

Some Rules Governing the Photochemical
Decomposition of Ozone in the Liquid Phase

SOV/76-32-7-23/45

nickel sulfate as light filter solutions. From the experimental results obtained it may be seen that the reaction velocity is directly proportional to the light intensity, and that the quantum yield of the reaction does not depend on the latter. The determinations in the gaseous phase supplied a quantum yield of 3,5 (average) as compared to the value of 2,0 according to Schumacher (Refs 4,5) and 3,0 according to Heidt (Ref 9) at the same concentrations. The value of 25 obtained for the liquid phase points out that there the ozone decomposition represents a chain reaction. The oxygen has an impeding effect, in the gaseous phase less than in the liquid phase, which fact is explained by a greater effect of the reaction $O + O_2 + O_3 = O_3 + O_3$. A scheme of the mechanism of the photochemical ozone decomposition obtained according to the method of the steady concentrations as suggested by Schumacher, is given. There are 6 figures, 5 tables, and 12 references, 1 of which is Soviet.

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Some Rules Governing the Photochemical
Decomposition of Ozone in the Liquid Phase

SOV/76-32-7-23/45

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva (Moscow,
Physicochemical Institute imeni L.Ya.Karpov)

SUBMITTED: March 14, 1957

1. Ozone (Liquid)--Decomposition 2. Ozone (Liquid)--Photochemical
reactions 3. Photochemical reactions--Velocity 4. Oxygen--Chemical
effects

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5(4)

AUTHORS: Kamenetskaya, S. A., Pshezhetskiy, S. Ya., SOV/76-32-10-30/39
Slavinskaya, N. A.

TITLE: The Effect of Ozone on the Ignition of Hydrocarbons
(Vliyaniye ozona na vosplamneniye uglevodorodov) I.
The Ignition of Butane With Oxygen (I.Vosplamneniye
butana s kislородom)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 10,
pp 2430 - 2436 (USSR)

ABSTRACT: According to N.N.Semenov the ignition of hydrocarbons
by oxygen represent an explosion. The kinetics of the
ethane ignition was investigated by N.M.Chirkov and
S.G.Entelis (Ref 1). A.B.Nalbandyan et al (Ref 2) as
well as Pease and Schubert (Piz and Shubert)(Ref 3)
investigated the use of ozone as activator in oxidation
processes. In the present paper data on the ignition
of butane are given; results of the investigations of
butylene and cyclohexane will be given in later papers.
Card 1/4 The butane to be investigated was overdistilled in a

The Effect of Ozone on the Ignition of Hydrocarbons.
I. The Ignition of Butane With Oxygen

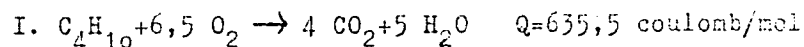
SOV/76-32-10-30/39

Podbil'nyak column after its separation from unsaturated hydrocarbons. The ozone was obtained by a silent discharge from electrolytic oxygen. The investigations were made in an apparatus represented schematically with a butane-oxygen mixture of 80% of the stoichiometric amount being used. The effect of ozone was investigated by the stepwise exchange of O_2 by O_3 in the mixture (at a constant amount of oxygen atoms). Ozone drops the lower ignition limit and shortens the induction period. These effects increase with the ozone content and a drop of the temperature. Calculations showed that ozone decreases the effective activation energy. According to A.M.Markevich (Refs 9,10) the decomposition of ozone takes place according to the equation $O_3 + \text{wall} \rightarrow [O_2] + O$. The effect of ozone on the ignition may be explained by a reaction of ozone and atomic oxygen with carbon, as well as by an excess heat content of ozone; active centers that start the chain reaction may form. Two summarization processes take place:

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I. The Ignition of Butane With Oxygen

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By an increase in temperature the oxidation process is displaced by that of cracking, which was also observed by V.Ya.Shtern (Ref 11), and which explains the temperature effect observed. There are 4 figures, 4 tables, and 12 references, 9 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im.L.Ya.Karpova (Physical Chemical Institute imeni L.Ya. Karpov)

SUBMITTED: May 3, 1957

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The Effect of Ozone on the Ignition of Hydrocarbons.
I. The Ignition of Butane With Oxygen

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5(4)
AUTHORS: Cherednichenko, V. M., Pospelova, I. N., SCV/76-32-12-3/32
Pshezhetskiy, S. Ya.

TITLE: The Effect of Ozone on the Speed of Combustion of Hydro-
carbons (Vliyaniye ozona na skorost' goreniya uglevodorodov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12,
pp 2673 - 2678 (USSR)

ABSTRACT: A mixture of n-butane, n-heptane, isooctane (2,2,4-trimethyl-
pentane), and cyclohexane with air or oxygen was burnt with
varying ozone additions. The rapid combustions were photo-
graphed with a photorecorder F R -60, the slow ones with a
time lapse motion camera. The combustion temperature was
calculated with the help of the thermodynamical tables of the
NACA (Ref 3) (Nat.Ass.Chem.Am.). The rate of combustion of
an n-butane-air mixture corresponds to M. Gerstein's (Ref 4)
statements. Ozone accelerates the rate of combustion and
increases the combustion temperature. The experimental re-
sults showed much higher values than were to be expected
according to Ya. B. Zel'dovich's and D. A. Frank-Kamenetskiy's

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The Effect of Ozone on the Speed of Combustion of Hydro- SOV/76-32-12-3/32
carbons

theory. Consequently, ozone does not only influence the physical process but exerts an essential influence on the chemical kinetics by dissociating into atomic oxygen. Results were compared with the influence of ozone on the critical conditions for the inflammation of butane-oxygen mixtures (S. A. Kamenetskaya, S. Ya. Pshezhetskiy, and N. A. Slavinskaya, Ref 1). The increase in the rate of combustion due to ozone is especially striking at low temperatures. At higher temperatures cracking reactions of the hydrocarbon molecules and radicals, and equilibrium concentrations of free radicals and atoms become more and more predominant. There is a linear relation between the rate of combustion and $\sqrt{C_{O_3}} (C_{O_2} - C_{O_3})$

ozone concentration). C. C. Schubert and R. N. Pease (Ref 5) made similar observations with slow reactions at room temperature. There are 4 figures, 4 tables, and 7 references, 3 of which are Soviet.

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carbons

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva
(Physico-Chemical Institute imeni L. Ya. Karpov , Moscow)

SUBMITTED: May 31, 1957

Card 3/3

5(4)

AUTHORS:

Pshezhetskiy, S. Ya., Dmitriyev, M. T.

SOV/76-32-12-5/32

TITLE:

The Relation Between the Energy Yield and the Kinetics of the Radiation-Chemical Reaction (Svyaz' mezhdru energeticheskim vykhodom i kinetikoj radiatsionno-khimicheskoy reaktsii)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12,
pp 2686 - 2689 (USSR)

ABSTRACT:

The energy yield of a radiation-chemical reaction in relation to the time of exposure is a function of its kinetics. It depends on whether the reaction takes place at a constant or rising speed, whether the reaction products are removed from the irradiation area, and on whether counter-reactions occur. Formulae are given for the various principal types of kinetics and for the operating conditions. There are 4 figures, 1 table and 1 Soviet reference.

ASSOCIATION:

Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskva
(Physico-Chemical Institute imeni L. Ya. Karpov, Moscow)

SUBMITTED:

July 1, 1957

Card 1/1

PHASE I BOOK EXPLOITATION 30V/4386

Moscow. Fiziko-khimiya Institut.

Problemy fizicheskoy khimii, Izd. VIM, 2 (Problems in Physical Chemistry; Transactions of the Institute, no. 2). Moscow, Goskhimizdat, 1959. 202 p. 1,000 copies printed.

Editorial Board: Ya. M. Varshavsky, Doctor of Chemical Sciences; G. S. Zhdanov, Doctor of Chemical Sciences; V. A. Kargin, Academician; Ya. M. Kolesnikov, Doctor of Chemical Sciences (Resp. Ed.); S. S. Medvedev, Academician; S. Ya. Panchenko, Doctor of Chemical Sciences; V. M. Cherednichenko, Candidate of Chemical Sciences; V. S. Chislava (Editorial Secretary), K.I. Ye. O. Shpak.

PURPOSE: This collection of articles is intended for physical chemists.

CONTENT: The collection is the second issue of the Transactions of the Scientific Research Institute of Physical Chemistry named L. Ya. Karpov. It contains 17 articles which review Card 1/5

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